UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

November 15, 2006

REPLY TO THE ATTENTION OF:

SR-6J

Via E-mail and Certified Mail
Return Receipt Requested

Ron Hutchens
Environ International Corporation
740 Waukegan Road, Suite 401
Deerfield, Illinois 60015

RE: Envirochem Site, Zionsville, IN
Consent Decree, Civil Action No. IP 83-1419-C-M/S
Additional Work Design Report Comments

Dear Mr. Hutchens:

Thank you for submitting the Design Report for additional work under the Consent Decree for the Envirochem Site, Zionsville, Indiana. The U.S. Environmental Protection Agency ("U.S. EPA") and its contractor CH2M Hill have reviewed the Design Report and our combined comments are enclosed with this letter. Please provide the revised Design Report incorporating the enclosed comments no later than December 18, 2006.

If you have any questions regarding this matter, please contact me at (312) 886-4442.

Sincerely,

Matthew J. Ohl

Matthew J. Ohl
Remedial Project Manager

enclosure

cc via e-mail: Tom Krueger, U.S. EPA
Bruce Hamilton, IDEM
Tim Harrison, CH2M Hill
Roy Ball, Trustee
Norman Bernstein, Trustee

Enclosure

Review comments on the *Design Report for the Attachment Z-1 Remedy, Enviro-Chem Superfund Site, Zionsville, Indiana, Revision 0* submitted by Environ International Corporation on September 11, 2006 are provided below.

General Comments

The fundamental objective of the Additional Work provided in the Record of Decision (ROD) has always been to ensure that the site till water does not migrate to the Unnamed Ditch or to the underlying sand & gravel and pose unacceptable risk to human health and the environment. The design of the revised Additional Work is insufficient to ensure that this objective is achieved. The United States Environmental Protection Agency (USEPA) has consistently requested that the system be designed to provide capture because the till will be very difficult to remediate. The system as currently designed appears to have marginal capability in achieving the objective of capture (largely because of the proposed water-level elevations in the collection trench - see comments below). The elevated water-level, coupled with the minimal 1-year proposed period to verify till water capture, could result in till water bypassing the containment system in the future.

The primary long-term objective of the trench system is to maintain capture of the onsite till water. The proposed elevations of the soil vapor extraction (SVE) piping that will serve to collect the till water appear to be set too high to prevent downward migration from the till to the underlying sand and gravel. Based on the water level measurements of 881 ft. for the sand and gravel piezometer PS-1 (reported in the Till Water Extraction Performance Testing Report in August 2006), the trench "Segment 1" SVE design pipe invert elevation of 882.5 ft. will result in about a 1.5 ft downward gradient to the sand and gravel. Likewise, the SVE pipe invert for "Segment 6" is proposed at 880.5 ft while the water level of the sand and gravel at PS-3, adjacent to Segment 6, is about 879.5 ft. A similar situation occurs for Segment 7 and is also likely for Segments 2 and 3. The SVE pipe invert should be lowered so that there is no downward gradient to the underlying sand and gravel.

Relative to till water elevations alone, the proposed SVE invert elevations are also marginal. The till water elevation, as measured at PT-2 is only 0.5 ft above the proposed SVE invert, providing little margin for future declines in the overall till water level. The SVE pipe invert proposed at Segment 4 is about 3 ft. above the July 2006 till water elevation at PT-4, adjacent to Segment 4. Given this invert elevation and till water elevation, Segment 4 would not collect water. The SVE pipe invert should be lowered so the SVE pipes control the till water gradient and capture all contaminated till water.

While the preferred operation of the permeable reactive gate system (PRGS) system is to allow passive gravity flow to the PRGS, active pumping may be necessary if gravity flow cannot be achieved based on the hydraulic losses of the collection system and the needed elevation of the infiltration bed. Alternatively, direct discharge of treated effluent to Unnamed Ditch without an infiltration basin would allow a greater hydraulic head across the conveyance and treatment system for gravity flow.

The performance criteria for the long-term operation of the thin barrier curtain wall (TBCW) and trench collection system require showing that the gradients are controlled through observation of water levels in the till and sand & gravel piezometers. It is doubtful that gradient control can be demonstrated through the water level measurements using the proposed SVE pipe invert elevations. The SVE pipe invert should be lowered so that there is no downward gradient to the underlying sand and gravel and so that capture of till water can be demonstrated through use of the till water level piezometers placed on either side of the TBCW. An inward gradient across the TBCW should be demonstrated for at least 2 years after the water level in the trench has risen to its design height and stabilized.

Specific Comments

1. **Pg. 3, Section 2.1, paragraph 2, last sentence;** This sentence is not clear. Consider adding 'vertical SVE wells', or revise accordingly.

2. **Pg. 3, Section 2.1, third bullet;** Soil Vapor Standards are in Table 3-1 and not 2-1 as listed.

3. **Pg. 4, Section 2.2.2;** Erosion and Sediment Control Measures should be conducted in accordance with State Best Management Practices (BMPs), please provide reference as appropriate.

4. **Pg. 6, Section 2.4.1., paragraph 1, sentence 4;** It is stated that soil excavated from the upper 2 feet of the trench can be stockpiled for reuse as surface backfill. Include an explanation of why this soil is not contaminated or include this soil as soil to be tested and treated if necessary.

5. **Pg. 6, Section 2.4.1., paragraph 1;** A biopolymer slurry will be added to the trenches during excavation. Upon completion of the excavation, enzymes may be added to dissolve the slurry. Presumably, remaining liquids will be conveyed to the wastewater treatment system for treatment prior to discharge. Has consideration been given to the potential negative impacts on residual BOD and COD from the bioslurry on the treatment system (e.g., high activated carbon usage rates and biofouling)?

6. **Pg. 14, Section 2.7.1., paragraph 1;** The discussion of the chemistry of the PRGS should also include a discussion of how the corrosion of iron results in the production of hydrogen gas which in turn reacts with the chlorinated volatile organic compound (VOC), replacing a chloride ion with a hydrogen ion. This is important because the potential for accumulation of explosive hydrogen gas needs to be considered in the reaction vessel design.

7. **Pg. 14, Section 2.7.1., paragraph 2;** The discussion of the PRGS bed design implies that Table 2-1 acceptable stream concentrations were used as the treated effluent discharge standards. Indiana Department of Environmental Management (IDEM) may require the lower of these values and the Table 2-3 Effluent limits for Discharge of Treated Water to Unnamed Ditch. Nearly all the Table 3 effluent limits are significantly lower than the Table 2-1 values.

8. **Pg. 16, bullet 2;** This discussion states that if the spoil soils whose synthetic precipitate leaching procedure (SPLP) results exceed the acceptable stream concentrations are evaluated using the Revised Universal Soil Loss Equation (RUSLE), and that evaluation shows there is no potential impact to the stream, then the spoil soils can be placed on the surface of the site and vegetated. Provide the details on how the RUSLE will be used to determine no impact on the stream when SPLP results show the spoil soil leach at concentrations indicative of an impact.

9. **Pg. 20, Section 3.5, sentence 2;** Change the word "spill" to "spike".

10. **Pg. 21, Section 3.6;** Please provide rationale for a rebound period of only 3 days. This is very short; rebound timeframe typically ranges between 2 to 4 weeks. A method for calculating rebound time is presented in Appendix F of the Soil Vapor Extraction and Bioventing Design Manual (US Army Corps of Engineers, EM 1110-1-4001, 3 June 2002).

11. **Pg. 21, Section 3.6;** Sample collection under dynamic conditions (during extraction) will not be representative of equilibrium concentrations due to venting efficiencies. Vapor samples should be collected under static, non-extraction conditions directly from the SVE well risers to provide representative data.

    As discussed in previous comments, demolition of the SVE and wastewater treatment facilities and use of temporary skid mounted systems may be acceptable if the following conditions are met:

    a) The skid mounted systems should be able to be operated year round (e.g. frost protected)

    b) They are sized and configured to adequately handle design operating conditions at all times.

    c) Main power hook-up capacity is maintained onsite for quick connection (within 24-hours) if action is triggered.

    d) Any associated skid mounted wastewater system used during dewatering of the trench prior to and during SVE operation will be able to achieve discharge requirements.

    e) Appropriate alarms, auto-dialers, controls, and secondary containment be provided to quickly address potential cases of system leak or failure.

    f) The system meets all the necessary design and performance criteria (e.g., the same radius of influence).

12. **Pg. 23, Section 4.1., Phase I Monitoring Overview;** To facilitate redevelopment of the site, the EnviroChem Trust proposed reducing the Phase I Monitoring period to one year. When this reduction was last discussed, it appeared to be acceptable to U.S. EPA and IDEM with the following conditions:

a) The site monitoring and sample collection activities and corresponding frequencies are consistent with the current plan.

b) The SVE will be restarted with the same action triggers and responses as currently defined in Attachment Z-1.

c) Monitoring of sand and gravel wells and trench influent monitoring (in addition to PGRS effluent) should be included in Phase II Long Term Monitoring. Any exceedance of site standards in the trench influent during Phase II would require initiation of SVE (may be skid mounted system). The remainder of the Phase II requirements would be unchanged.

The full ramifications of this proposal were not known at the time because the design of the system was not yet performed. Because of the design choices including the water levels to be maintained in the trenches, a longer Phase I monitoring period is needed. The current Phase I monitoring period only includes four quarters of sampling of:

a) surface water and water in each SVE trench segment;

b) three sand and gravel wells; and

c) water levels in the TBCW piezometers.

After this Phase I monitoring period, there is no further sampling of surface water, sand & gravel monitoring wells, or water level measurements proposed. In effect then, there will be just a one year period to ensure the system is capturing the till water and that the sand gravel is not being contaminated from downward migration. These are significant issues based on several concerns including, without limitation, the following:

a) given the proposed water levels that are planned to be maintained in the SVE trenches (see General Comments), the potential for downward migration from the till to the underlying sand and gravel is increased and a one year period to evaluate this migration is not sufficient;

b) the proposed water levels in the SVE trenches increase the likelihood that till water will not be contained in years of lower infiltration (i.e. water level in the till drops and the SVE pipes are now above the till water level); and

c) the 1-year period of monitoring is predicated on the trenches being at their design water elevation so that a full year of monitoring is available to evaluate till water capture (it is possible that many months may be required for the water level to rise in the trenches to the design elevation for the collection system).

Once the duration of the Phase I monitoring period is determined, quarterly monitoring should begin and continue for a reasonable period of time after the water levels have risen to the design elevation of the trench collection system.

13. **Pg. 25, Section 5.2.1; Phase II Long-term Monitoring;** This section states that the augmented SVE system will be reactivated if an exceedance of acceptable stream concentrations is present in the trench dewatering wells. It should also state that the

reactivation may either be done using the augmented SVE system or a skid mounted SVE system with additional capabilities of treating the water from trench dewatering. This is to make this section consistent with Section 4.3 that states at the completion of Phase I Monitoring the SVE system may be removed.

This section further states that following the determination that the soil vapor meets Soil Vapor Standards, the initial 2-year Phase II monitoring period will resume rather than restart. Given the semiannual frequency of monitoring, this may result in inadequate monitoring of rebound. A prompt response to such rebound would be unlikely, especially near the end of the monitoring period. Monitoring should be conducted quarterly to detect rebound earlier and allow for a prompt response.

14. **Pg. 25, Section 5.2.2; Phase II Long-term Monitoring;** This section states that the monitoring frequency may be temporarily increased to semiannual if the fresh PRGS bed cannot meet standards. If the PRGS bed does not meet standards a significant treatment component of the additional work has failed. Monitoring should be conducted quarterly or more often as determined by U.S. EPA while the additional response measures are promptly evaluated and implemented.

15. **Figure C-3;** The PRGS conveyance pipe is not shown connected from PRGS Manhole 1 to Segment 1.

16. **Figure C-7, Segment 5;** The southern end of SVE pipe has a note that references connection to Manhole 6, but the PRGS conveyance pipe references connection to Manhole 5. Please clarify.

17. **Figure C-10, PRGS Conveyance Pipe Trench;** The SVE pipe should be placed in pipe bedding material such that the bedding material extends above the SVE pipe. Reference beneath "4-inch diameter section of non-slotted SVE screen" (aka casing) should be at the South end of trench only.

18. **Figure C-10, Typical Augmented SVE Trench Section with Dewatering Well;** What is the rationale for Pump High Level On set point 1-foot above the screen? This seems too high.

19. **Figure C-10;** Schedule A Site Trench 6 elevation is shown as 878.0 ft. but on drawing C-7 it is shown as 880.5 ft. Correct once SVE trench elevations are resolved per earlier comments.

20. **Figure C-12;** The PRGS Cross Section A-A' bottom of tank is shown as extending about 1 foot below elevation 874 ft., but is shown on the same drawing schematic cross-section as extending only to 874 ft. Please clarify.

21. **Figure C-12;** On the PRGS cross section B-B', the effluent sampling port is shown as terminating at about elevation 879 ft. Consideration should be given to extending this closer

to the surface so that sampling personnel can more easily access this port with entering the tank. Also the cross-section should show the sampling port access.

22. **Figure P-1;** Control Panel for Dewatering well pump references Note 3 which does not exist.

23. **Figure P-1;** Note for BL-500 (lower right corner); Horsepower is incorrectly spelled.

24. **Appendix A, Section 02206-5, 3.01A;** This section states that the PRG conveyance pipe is comprised of polyvinyl chloride (PVC) screen when the pipe is actually solid PVC.

25. **Appendix D, pg. D-3;** Please provide a list of the contaminants of concern (COCs), the estimated influent concentrations and the estimated decay rates to allow review of the design of the retention time for COC degradation.